

EPA Five-Year Review Signature Cover
Key Review Information

Sent
9/21/99

Site Identification

Site Name: **Colbert Landfill**
Spokane County, Washington

EPA ID: WAD980514541
EPA Region: 10

Site Status

NPL Status: Final NPL List (10/83)
Remediation Status: Construction Completed, Operating, O&M
Number of OUs: One, Entire Site
Construction Completion Date: May 31, 1997 (Accepted by County)
Site Lead: PRP Lead Agency: Joint; EPA & Ecology
Site is NOT destined for Reuse

Review Status

Statutory Required Five-Year Review

Five-Year Review Conducted By: Neil E. Thompson, Project Manager
Superfund Cleanup Unit 4
Office of Environmental Cleanup
EPA Region 10, Seattle, WA

Five-Year Review: 5/24/99 - 8/27/99 Site Inspection: 7/26/99

Trigger Action and Event

Five-Year Review History:	#1: 7/13/94	Site Inspection:	7/13/94 (PCOR)
		Site Inspection:	9/9/97 (post-const)
	#2: 7/26/99	Site Inspection:	7/26/99 (2 nd 5-Year)

Next Five-Year Review: 5 years (2004)



Five-Year Review Summary

Colbert Landfill, Spokane County, WA
EPA Region 10

Deficiencies:

None noted.

Recommendation and Required Actions:

None recommended based on the review and Site Inspection.

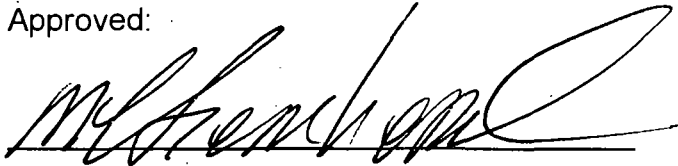
Protectiveness Statement:

Based on this Five-Year Review, the Colbert Landfill Superfund site remedial actions are operating and functioning as designed, and institutional controls are in place and are protective. The remedial action cleanup levels remain protective of human health and the environment.

Other Comments:

Spokane County has continued to operate the groundwater extraction and treatment system and perform the operations and maintenance (O&M) of the system in a very effective manner. The Project Manager and staff are well trained and keep very complete records of system activities. In-house staff have been satisfactorily trained to operate the systems and take samples for performance and compliance monitoring. The county has adequately funded the O&M since the construction was completed. Project staff have identified "watch" areas to identify potential problem areas before they become environmental problems or emergency O&M issues. No problems were identified during the Five-Year Review of this site.

Approved:



Mike Gearheard, Director
Environmental Cleanup Office
EPA Region 10

9-20-99

Date

Five-Year Review Report

I. Introduction

The U.S. Environmental Protection Agency (EPA) Region 10 has conducted a Five-Year review of the remedial actions implemented at the Colbert Landfill (Site) located in Spokane County, Washington. This review was conducted from May through August, 1999. This report documents the results of the review.

The purpose of the Five-Year Review is to determine whether the remedy at the Site has remained protective of human health and the environment. The methods, findings, and conclusions of the review are documented in this report. In addition, any deficiencies and recommendations that were identified are described and have been reported to the responsible party.

Statutory Review

This is a Statutory Five-Year review. Statutory reviews are required for sites where hazardous substances, pollutants, or contaminants above levels that will not allow for unlimited use or unrestricted exposure will remain onsite even after the remedial action has been implemented. EPA must implement Five-Year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is considered the second Five-Year Review for Colbert Landfill. The trigger date for this site is the Contract Award date for the start of construction of the remedial action as reported in the EPA WasteLAN database; 8/28/89. The initial Five-Year

Review was done on July 13, 1994, just after the construction of the groundwater extraction and treatment system was completed. A second site inspection was done at the completion of the landfill cap and cover system on September 9, 1997.

Waste organic solvents were dumped into the landfill for disposal and migrated to the groundwater aquifers beneath the site. The remedial actions are to mitigate the contamination in the aquifers to concentrations below the drinking water criteria, thus allowing unrestricted use of the groundwater. The waste solvents found in the landfill waste were not found to be a continuing source and were contained within the closed and capped landfill.

II. Site Chronology

Chronology of Site Events	
<u>Event</u>	<u>Date</u>
Initial Problem Identification	4/24/80
Final NPL Listing	9/08/83
Interim Remedial Measure (alternate water supply)	fall 1985
RIFS Completed	9/29/87
ROD Signed	9/29/87
RD/RA Consent Decree (effective date)	2/28/89
RA Construction Started (monitoring wells)	8/28/89
Design Completed (extraction/treatment system)	7/12/93
Previous Five-Year Review (during construction period)	7/13/94
Construction Start (landfill closure)	8/15/96
Construction Completed (extraction/treatment system)	2/33/97
Construction Completed (landfill closure)	5/31/97
EPA Construction Closeout Report (PCOR)	9/09/97

III. Background

The Colbert Landfill Superfund site is a closed, 40-acre, municipal solid waste landfill located approximately 15 miles north of Spokane, Washington, and about 2.5 miles north of Colbert, Washington. The site is owned and was operated by Spokane County (County). The landfill operated from 1968 to 1986, when it became filled to capacity and was covered. The landfill was capped and closed under the State of Washington regulations for solid waste units in 1996. The state landfill closure requirements meet the EPA closure requirements. The cap is a multi-layered, low permeable, cover system designed to reduce infiltration into the buried waste. The site is in a rural setting that is experiencing rural growth on 5-acre parcels. West of the

landfill is a new city/county solid waste transfer facility. In 1983, 20 domestic wells were found to be contaminated above drinking water standards by contaminated groundwater.

Groundwater in the vicinity of the landfill is contaminated with chlorinated organic solvents. At least part of this contamination has been traced to spent solvents that were disposed of at the landfill. Solvents were reportedly disposed of at an average rate of several hundred gallons per month for a number of years, and primarily consisted of 1,1,1-trichloroethane (TCA) and methylene chloride (MC). Other organic solvents were also detected in groundwater near the landfill, including trichloroethylene (TCE), tetrachloroethylene (PCE), 1,1-dichloroethylene (DCE), and 1,1-dichloroethane (DCA). These six chlorinated organic solvents are referred to as the "Contaminants of Concern."

In 1980, nearby residents complained to the Eastern Regional Office of the Washington Department of Ecology (Ecology) about disposal practices at the landfill. The U.S. Environmental Protection Agency (EPA) and Ecology supported the Spokane County Utilities Department with an investigation into the citizen complaints and initiated a groundwater contamination study by sampling nearby private wells. The results of this initial sampling and investigation indicated that some private domestic wells were contaminated and an alternate drinking water source was suggested by the Spokane County Health District.

EPA and Ecology recommended the site for the National Priorities List (NPL) in 1982. In October 1983, the landfill was added to the NPL list by EPA.

IV. Remedial Actions

The Spokane County Utilities Department began studies shortly after the identification of the contaminated groundwater problem in 1980. The initial studies were focused on determining the source of the contamination. Then in 1984 the remedial investigation (RI) was started to determine the nature and extent of the contamination under the direction of Ecology.

The RI data gathering process included the installation and sampling of 34 new groundwater monitoring wells and sampling over 50 private domestic wells around the site. Soil vapor and electromagnetic remote sensing technologies were also used to enhance the well data.

A Risk Assessment was done as a part of the study to evaluate the RI data in terms of risk to human health and the environment. Based upon the Risk Assessment, it was concluded that the most significant risks were from ingestion of (drinking) water

from contaminated wells. TCA exceeded the Maximum Contaminant Level (MCL) of 200 µg/l for drinking water in several domestic wells. Concentrations of TCA in the aquifer were consistently around 2000 µg/l in several areas around the landfill.

Although the groundwater is contaminated, the health risks posed by eating crops irrigated by the contaminated groundwater were not considered significant, nor were ingestion of beef or dairy products coming from these irrigated fields. Even the inhalation exposure to volatile organics from showering did not present a public health risk. These risks have been even further reduced since groundwater treatment has occurred.

The discharge of treated groundwater is to the Little Spokane River. An analysis of the potential effluent was done to determine if current discharge standards would be protective. The river has special phosphorous limitations which had to be met in addition to VOC loadings.

All the data was evaluated for potential remedies in the site feasibility study (FS) completed in 1987. The RI/FS determined that the two primary aquifers in the landfill vicinity, and a low-productivity aquifer to the east of the landfill are contaminated with some or all of the Contaminants of Concern. The FS recommended a pump and treat remedy to address this groundwater contamination.

On September 29, 1987, the Record of Decision (ROD) was signed by EPA requiring implementation of the following remedial actions:

- Prevent the further spread of contaminated groundwater towards the south and west from the landfill in the two aquifers by installing and operating interception wells and treating the extracted groundwater;
- Remove contaminated source materials from the groundwater to the east of the landfill which have entered the aquifers and are contributing to the contaminant plume, by installing and operating extraction wells in the area where the plumes originate and treating the effluent; and
- Provide an alternate water supply system to any residents whose domestic water supply has been effected by contamination from the landfill or by the action of the extraction systems,
- Close the landfill to comply with the Ecology landfill closure regulations.

Three of the four identified Potentially Responsible Parties (PRPs) agreed to implement the ROD and signed a Consent Decree along with EPA and Ecology which was entered on February 28, 1989. The County agreed to take the lead on performing

the remedial actions with the others providing financial support. The fourth PRP, which did not sign the Consent Decree, did settle with EPA at a later date.

Remedial Construction Activities

The construction activities related to the remedial actions were all completed by Spokane County Utilities Department through County awarded contracts. The County hired an engineering firm to design and then to provide construction management for the construction contracts. County engineering staff were in charge of the project and provided oversight of the construction contractors.

The remedial construction actions were divided into three separate projects: an Initial Remedial Measure (IRM); installation of the ground water extraction and treatment system; and landfill closure.

The IRM was the construction of an alternate water supply system to the affected area. This action was designed and constructed before the RI was completed. It consisted of the extension of a municipal (Whitworth Water District #8) supply system. Construction was started in the fall of 1984 and completed in the fall of 1985. The county connected 23 residences with contaminated wells to the new alternate water supply. The supply system was designed to serve the whole area as the needs arose.

The extraction and treatment system consists of 10 extraction wells, the necessary pumps, piping, and controls, and the air-stripping treatment facility with its discharge of treated water to the Little Spokane River.

The landfill closure was designed and constructed after the extraction and treatment system was complete to allow for access to the landfill area if needed for this system and to allow changes in the state closure requirements to become finalized prior to design. The new landfill closure requirements were finalized after the ROD was signed and it was important to incorporate the new requirements since they were significantly more stringent than the previous ones and were consistent with the EPA RCRA Subtitle D landfill closure requirements.

The original cost estimate to implement the remedial actions described in the ROD was about \$14 million. The cost estimates were developed for various alternatives in the FS. Because the selected remedy was a pump and treatment project, the remedial action costs were projected for 30 years of operations and maintenance.

The actual costs for construction of the extraction and treatment system exceeded the original estimates for construction primarily because additional aquifer and plume definition were required before placement of the extraction well systems. An additional 30 monitoring wells at 19 locations were needed because the RI data was inadequate to design the selected remedial action.

The design and construction, including a pilot treatment plant, took about four years to complete. The final start-up of the treatment facility was only about four months later than was scheduled in the original design/construction work plan. The pump and treatment system was substantially complete on May 3, 1994.

A pre-final construction completion inspection of the treatment facility and extraction wells was done by the EPA project manager on July 13, 1994. Punch list items were related to the computerized controls and wireless telemetry that would make the operation of the system less labor intensive. It took almost a year, February 22, 1995, to debug the electronics and have them accepted by the County.

The following is a summary of the construction events for the extraction and treatment facility phase of the project:

- Fall 1984 to Fall 1985 - Design and construction of the pipeline extension to bring the alternate water supply into the residential area around the landfill.
- March 23, 1989 - County signed the design contract.
- August 8, 1989 - Contract awarded to construct monitoring and extraction wells to be used both for the pilot treatment studies and the final pump and treat.
- 1990-1991 - Construction of the 30 new monitoring wells, the 4 extraction wells to be used for the pilot tests, the effluent discharge line to the Little Spokane River, and a meteorological station. The pilot tests were completed during the Spring of 1990.
- December 1991 - Final Phase I Engineering Report providing results of the pilot air stripping tower and groundwater treatability studies.
- March 1992 - Preliminary Treatment and Discharge Plan, Phase II Remedial Design/Remedial Action Plan.
- July 12, 1993 - Approval of the Plans and Technical Specifications for bid.

September 1993 - Construction of the air-stripping towers, treatment building, and extraction system began.

May 3, 1994 - County accepted pump and treatment facility as functionally complete.

July 13, 1994 - EPA performed a Pre-Final Close Out Inspection site inspection of the extraction and treatment systems.

February 22, 1995 - Spokane County fully accepted the treatment facility and extraction well system.

The remedial construction activities consisted of installing monitoring wells, extraction wells, an air-stripping treatment facility, and over four miles of piping conveyance to bring the extracted contaminated groundwater into the air-stripping unit for treatment and then discharge to the Little Spokane River.

A pilot treatment system was constructed and tested in two locations to obtain design data for the design and construction of the air-stripping tower and treatment facility. Although the pilot tests were just satisfactory, they did provide the necessary design data for the treatment facility.

Treated groundwater discharges easily meet the effluent limits for the Contaminants of Concern and other National Pollution Discharge Elimination System (NPDES) substantive requirements. There have been no violations of the effluent limits since the treatment plant came on-line. Treated discharge data is being collected as part of the NPDES requirements.

The third phase of construction for this project was the upgraded closure of the landfill. When the landfill was filled to capacity and waste no longer accepted, clean cover soils were placed over the waste units. It was agreed in the ROD that the County would upgrade the cover to meet all of the revised landfill closure requirements which were under review at that time.

The following is a listing of some of the important actions that lead to landfill closure:

Summer 1986 - The landfill was filled to capacity and closed for the disposal of further waste material.

Summer 1986 - A minimum of two feet of clean cover material (soil) was placed over the buried waste units. The site was surveyed to insure that there was at least two feet of clean cover over all of the site for

compliance with the operating permit. At the time the ROD was written, this was the state requirement for landfill closure.

- August 29, 1995 - Contracted for design of the landfill cap to be consistent with current state and federal closure regulations.
- April 15, 1996 - Notice to Proceed for construction of the landfill closure.
- August, 1996 - Construction essentially complete for all of the work elements.
- April 3, 1996 - Preliminary Close Out site inspection of landfill closure by Ecology and EPA.
- May 31, 1997 - Construction contract fulfilled. All of the punch-list items were completed. Remedial actions fully operational and functional.

System Operations/O&M

The County hired and trained a system operator to run the extraction and treatment systems. She was in-place before the completion of construction and was trained during startup of the system. The County also hired and trained staff to perform the groundwater sampling which is a required part of the system performance and compliance monitoring. The County's Project Manager and staff have a solid command of the treatment needs, processes, and functions of the overall pump and treat system for groundwater contamination control and cleanup.

Progress Since the Last Five-Year Review

The County accepted the project from the construction contractor in 1997, after the first Five-Year Review. The groundwater monitoring is providing data that concludes that the systems are working. The overall concentrations of contaminants in the groundwater are decreasing, and the plume is not expanding in size. The concentrations of groundwater contaminants reaching the extraction wells in the South Extraction System has decreased sufficiently to allow three of the four extraction wells to be converted to monitoring wells and still maintain the required groundwater quality. At the time of this review, seven of the original 10 extraction wells are delivering contaminated groundwater to the treatment facility.

V. Five-Year Review Findings

The review included the monitoring data generated from the site monitoring program. Monthly data on water quality provide the project managers with checks on whether the extraction and treatment system was providing the hydraulic barrier and source control as expected. With over five years of data available on the aquifer water quality and on the performance of the treatment system, reliability and trends can be established. The active extraction and treatment system is performing within the design parameters and there have been no problems meeting the effluent discharge requirements. Data also indicates that the contaminant concentrations in the aquifers are decreasing steadily. The system is working to clean up the contamination well enough that three extraction wells in the South System could be turned off demonstrating that cleanup has occurred in the aquifer.

The operations staff have tremendous knowledge about the working and functions of the project from water quality monitoring to maintenance of the treatment system. The staff have diagnosed problems and made improvements and fixes to various parts of the system as they arose. This trained staff are proving to be an asset to the county as it closes other county landfills. Having the operators respond to system glitches 24-hours-a-day seems to be a great incentive to solving the cause of problems not just restarting or patching the effects.

VI. Assessment

This project is working as designed and continuing to provide protection to users of this groundwater resource. The contaminated plume is defined and the concentrations of contaminants are decreasing throughout the contaminated zone. The plume has been prevented from expanding and potentially impacting additional users of the groundwater. The municipal water supply system has been able to expand to provide potable water to any new residents that moved into the area. The county has been able to keep new wells from being constructed over the plume. The remedial actions remain protective of human health and the environment.

VII. Deficiencies

No specific deficiencies were noted during the file review or during the site inspection. The "Five-Year Review Site Inspection Checklist (Template)" is attached with the results of the site inspection.

VIII. Recommendations and Required Actions

No specific actions for improvements or changes are being forwarded to the PRPs based on this Five-Year Review.

IX. Protectiveness Statement

The cleanup goals for the groundwater that were established in the ROD are still considered protective of human health and the environment and the remedial actions for this site were protective when constructed and continue to remain protective.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be filled in by hand and attached to the five-year review report as supporting documentation of site status.)

I. SITE INFORMATION	
Site name: <u>COLBERT LANDFILL</u>	Date of inspection: <u>JULY 26 1999</u>
Location and region: <u>SPOKANE WA RIO</u>	EPA ID: <u>WA D980514541</u>
Agency, office or company leading the Five-Year Review: <u>EPA - REGION 10</u>	Weather/temperature: <u>CLEAR 80°F</u>
Remedy Includes (Check all that apply) <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other _____	
<input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached <u>no</u>	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager <u>BILL WEDLAKE</u> <u>PROJECT MGR</u> <u>7/26/99</u> <div style="display: flex; justify-content: space-between; font-size: small;"> Name Title Date </div> Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. <u>509-456-3604</u> Problems, suggestions; <input type="checkbox"/> Report attached _____	
2. O&M staff <u>DER GEIGER</u> <u>SR ENVIROTECH</u> <u>7/26/99</u> <div style="display: flex; justify-content: space-between; font-size: small;"> Name Title Date </div> Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. <u>509-456-3604</u> Problems, suggestions; <input type="checkbox"/> Report attached _____	

3. EPA INSPECTOR: NEIL THOMPSON, PROJECT MANAGER, 206-553-7177

- Agency _____
Contact _____

Name	Title	Date	Phone no.
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Problems; suggestions; ☐ Report attached

Agency _____

Contact _____

Name _____

Title

Date _____

Phone no.

Problems; suggestions; ☐ Report attached

Agency _____

Contact

Name _____

Title

Date _____

Phone no.

Problems; suggestions; ☐ Report attached

Agency _____

Contact _____

Name _____

Title

Date _____

Phone no.

Problems; suggestions; ☐ Report attached

4. Other interviews (optional) ☐ Report attached.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Manual and As-Builts** ☒ Readily available ☒ Up to date ☐ N/A
☒ As-builts ☒ Readily available ☒ Up to date ☐ N/A
☒ Maintenance Logs ☒ Readily available ☐ Up to date ☐ N/A
Remarks _____
2. **Site Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
☒ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A
Remarks _____
3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A
Remarks _____
4. **Permits and Service Agreements**
☐ Air discharge permit ☒ Readily available ☒ Up to date ☐ N/A
☐ Effluent discharge ☒ Readily available ☒ Up to date ☐ N/A
☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☐ N/A
☐ Other permits _____ ☐ Readily available ☐ Up to date ☐ N/A
Remarks NO PERMITS - MEETS SUBSTANTIVE REQUIREMENTS
- UNDER STATE SUPERVISION
5. **Gas Generation Records** ☒ Readily available ☒ Up to date ☐ N/A
Remarks NO FLARES - ACTIVATED CARBON SCRUBBERS ON
GAS RECOVERY WELLS
6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A
Remarks _____
7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A
Remarks _____
8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A
Remarks _____
9. **Discharge Compliance Records**
☒ Air ☒ Readily available ☒ Up to date ☐ N/A
☒ Water (effluent) ☒ Readily available ☒ Up to date ☐ N/A
Remarks _____
10. **Daily Access/Security Logs**
☒ Readily available ☒ Up to date ☐ N/A
Remarks LOCKED GATES - ENTRANCES RECORDED ON DATA LOGGER
- ALARMS ON THE BLDG

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☒ PRP in-house ☐ Contractor for PRP
☐ Other _____

2. O&M Cost Records

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place

Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____ To _____ ☐ Breakdown attached
Dates _____ Total cost

From _____ To _____ ☐ Breakdown attached
Dates _____ Total cost

From _____ To _____ ☐ Breakdown attached
Dates _____ Total cost

From _____ To _____ ☐ Breakdown attached
Dates _____ Total cost

From _____ To _____ ☐ Breakdown attached
Dates _____ Total cost

\$ 500,000 / yr
total

inc: personnel
elect
maintenance
etc.

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons:

Y2K - CORRECTIVE ACTION - MAJOR SOFTWARE CHANGES
ICE STORM DAMAGE

V. GENERAL SITE CONDITIONS

Whenever possible, actual site conditions should be documented with photographs.

A. Fencing

1. Fencing damaged ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks TREE AND CAR DAMAGE - FIXED

B. Site Access

1. Access restrictions, signs, other security measures ☐ Location shown on map ☐ N/A

Remarks GATED

C. Perimeter Roads

1. Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A

Remarks

D. General

1. Vandalism/trespassing ☐ Location shown on site map ☒ No vandalism evident

Remarks

2. Land use changes onsite ☒ N/A

Remarks

3. Land use changes offsite ☒ N/A

Remarks

4. Institutional controls (site conditions imply institutional controls not being enforced) <input type="checkbox"/> N/A Agency <u>SPOKANE CO. HEALTH DISTRICT</u> Contact <u>STEVE HOLDENBY</u> <u>509-324-1560</u> <div style="display: flex; justify-content: space-between;"> Name Title Date Phone no. </div> Problems; suggestions; <input type="checkbox"/> Report attached <u>N/A</u>			
VI. LANDFILL COVER <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable			
A. Landfill Surface			
1. Settlement (Low spots) <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident Areal extent <u>150 ft²</u> Depth <u>12"-24"</u> Remarks <u>BEING WATCHED - STAKED AND MEASURED</u> <div style="float: right; text-align: right;"> </div>			
2. Cracks <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Cracking not evident Lengths _____ Widths _____ Depths _____ Remarks _____			
3. Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Areal extent _____ Depth _____ Remarks _____			
4. Holes <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Holes not evident Areal extent _____ Depth _____ Remarks <u>GOPHERS - ABOVE MEMBRANE IN VEGETATIVE COVER 6"</u>			
5. Vegetative Cover <input checked="" type="checkbox"/> Grass <input checked="" type="checkbox"/> Cover properly established <input type="checkbox"/> No signs of stress <input type="checkbox"/> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____			
6. Alternative Cover (armored rock, concrete, etc.) <input checked="" type="checkbox"/> N/A Remarks _____			
7. Bulges <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Bulges not evident Areal extent _____ Height _____ Remarks _____			
8. Wet Areas/Water Damage <input type="checkbox"/> Wet areas/water damage not evident <input checked="" type="checkbox"/> Wet areas <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Ponding <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Seeps <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Soft subgrade <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks <u>ONLY IN SETTLED AREA - NO STANDING WATER</u>			
9. Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No evidence of slope instability Areal extent _____ Remarks _____			
B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			

1. Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____		
2. Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____		
3. Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
Remarks _____		
C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> Not applicable (Channel lined with erosion control mats, riprap, grout bags, or gabions that descends down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1. Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
Areal extent _____ Depth _____		
Remarks _____		
2. Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
Material type _____ Areal extent _____		
Remarks _____		
3. Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
Areal extent _____ Depth _____		
Remarks _____		
4. Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
Areal extent _____ Depth _____		
Remarks _____		
5. Obstructions	Type _____	<input type="checkbox"/> No obstructions
<input type="checkbox"/> Location shown on site map		
Areal extent _____		
Size _____		
Remarks _____		
6. Excessive Vegetative Growth	Type _____	
<input type="checkbox"/> No evidence of excessive growth		
<input type="checkbox"/> Vegetation in channels does not obstruct flow		
<input type="checkbox"/> Location shown on site map		
Areal extent _____		
Remarks _____		
D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable		
1. Gas Vents	<input checked="" type="checkbox"/> Active <input type="checkbox"/> Passive	<input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning
<input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration		
<input checked="" type="checkbox"/> N/A		
Remarks <u>NOT</u> <u>THIS IS A PROBLEM AT THIS SITE</u>		
<u>— VERY LITTLE SETTLEMENT NOTED — ONE SMALL SPOT</u>		

2.	Gas Monitoring Probes	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____
3.	Monitoring Wells (within surface area of landfill)	<input checked="" type="checkbox"/> Properly secured/locked	<input checked="" type="checkbox"/> Functioning	<input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> N/A Remarks _____
4.	Leachate Extraction Wells	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M <input type="checkbox"/> Evidence of leakage at penetration <input checked="" type="checkbox"/> N/A Remarks _____
5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input checked="" type="checkbox"/> N/A Remarks _____
E. Gas Collection and Treatment				
1.	Gas Treatment Facilities	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs O&M Remarks <u>SCRUB MECHANISM ETC. USING CARBON ABSORPTION</u>
2.	Gas Collection Wells, Manifolds and Piping	<input checked="" type="checkbox"/> Good condition	<input type="checkbox"/> Needs O&M	Remarks _____
F. Cover Drainage Layer <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable				
1.	Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input checked="" type="checkbox"/> N/A	Remarks <u>SHEET PILE</u>
2.	Outlet Rock Inspected	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A	Remarks _____
G. Detention/Sedimentation Ponds <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable				
1.	Siltation	Areal extent _____	Depth _____	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> Siltation not evident Remarks _____
2.	Erosion	Areal extent _____	Depth _____	<input checked="" type="checkbox"/> Erosion not evident Remarks _____
3.	Outlet Works	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A	Remarks _____

4. Dam	<input type="checkbox"/> Functioning	<input checked="" type="checkbox"/> N/A
Remarks _____		
H. Retaining Walls <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable		
1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		
2. Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Degradation not evident
Remarks _____		
I. Perimeter Ditches/Off-Site Discharge <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable		
1. Siltation	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Siltation not evident
Areal extent _____ Depth _____		
Remarks _____		
2. Vegetative Growth	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Vegetation does not impede flow		
Areal extent _____ Type _____		
Remarks _____		
3. Erosion	<input type="checkbox"/> Location shown on site map	<input checked="" type="checkbox"/> Erosion not evident
Areal extent _____ Depth _____		
Remarks _____		
4. Discharge Structure	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		
VII. VERTICAL BARRIER WALLS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> Not applicable		
1. Settlement	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Settlement not evident
Areal extent _____ Depth _____		
Remarks _____		
2. Performance Monitoring	Type of monitoring _____	
<input type="checkbox"/> Performance not monitored		
Frequency _____ <input type="checkbox"/> Evidence of breaching		
Remarks _____		
VIII. GROUNDWATER/SURFACE WATER REMEDIES <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable		
A. Groundwater Extraction Wells, Pumps, and Pipelines		
<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> Not applicable		

1. **Pumps, Wellhead Plumbing, and Electrical**

☒ Good condition ☒ All required wells located ☐ Needs O&M ☐ N/A

Remarks _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**

☒ Good condition ☐ Needs O&M

Remarks _____

B. Surface Water Collection Structures, Pumps, and Pipelines

☐ Applicable ☒ Not applicable

1. **Collection Structures, Pumps, and Electrical**

☐ Good condition ☐ Needs O&M

Remarks _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**

☐ Good condition ☐ Needs O&M

Remarks _____

C. Treatment System ☒ Applicable ☐ Not applicable

1. **Treatment Train (Check components that apply)**

☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☒ Air stripping ☐ Carbon adsorbers

☐ Filters ☐ Others _____

☐ Good condition ☐ Needs O&M

☒ Sampling ports properly marked and functional

☒ Sampling/maintenance log displayed and up to date

☒ Equipment properly identified

☐ Quantity of groundwater treated annually 350 M gallons

☐ Quantity of surface water treated annually NA

1.3 mgd

Remarks _____

2. **Electrical Enclosures and Panels (properly rated and functional)** ☐ N/A

☒ Good condition ☐ Needs O&M

Remarks _____

3. **Tanks, Vaults, Storage Vessels** ☐ N/A

☒ Good condition ☒ Proper secondary containment ☐ Needs O&M

Remarks _____

4. **Discharge Structure and Appurtenances** ☐ N/A

☒ Good condition ☐ Needs O&M

Remarks _____

5. **Treatment Building(s)** ☐ N/A

☒ Good condition ☐ Needs repair

☐ Chemicals and equipment properly stored

Remarks _____

6. **Monitoring Wells** (pump and treatment remedy) ☐ Properly secured/locked
☒ Functioning ☒ Routinely sampled ☒ Good condition ☒ All required wells located
☐ Needs O&M ☐ N/A

Remarks _____

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy) ☐ Properly secured/locked
☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ All required wells located ☐ Needs O&M ☒ N/A

Remarks _____

IX. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

X. OVERALL OBSERVATIONS

A. Effectiveness of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy and the Continued Need for O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C. Early Indicators of Potential Remedy Failure

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.
